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August 15, 2014

VIA ELECTRONIC FILING

Ms. Jocelyn Boyd
Chief Clerk & Administrator
Public Service Commission of South Carolina
Synergy Business Park, Saluda Building
101 Executive Center Drive, Suite 100
Columbia, SC 29210

Re: Duke Energy Carolinas, LLC's Annual Review of Base Rates for Fuel Costs
Docket No. 2014-3-E

Dear Ms. Boyd:

Enclosed for filing please find the Supplemental Testimony of Robert J. Duncan, II for Duke Energy Carolinas, LLC in the above-referenced docket. By copy of this letter we are serving the same on the parties of record.

If you have any questions, please let me know.

Yours truly,

ROBINSON, MCFADDEN & MOORE, P.C.

Frank R. Ellerbe, III

FRE/tch
Enclosures
cc: F. David Butler, Standing Hearing Officer (via email)
Shannon Bowyer Hudson, Esquire (via email and US Mail)
Andrew M. Bateman, Esquire (via email and US Mail)
Scott Elliott, Esquire (via email and US Mail)
J. Blanding Holman, IV, Esquire (via email and US Mail)
Timika Shafeek-Horton, Deputy General Counsel (via email)
Brian L. Franklin, Esquire (via email)

BEFORE THE
PUBLIC SERVICE COMMISSION OF
SOUTH CAROLINA
DOCKET NO. 2014-3-E

In the Matter of	)	
Annual Review of Base Rates	)	**SUPPLEMENTAL TESTIMONY OF**
for Fuel Costs for	)	**ROBERT J. DUNCAN, II FOR**
Duke Energy Carolinas, LLC	)	**DUKE ENERGY CAROLINAS, LLC**

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Robert J. ("Bob") Duncan, II. My business address is 526 South Church Street, Charlotte, North Carolina.

Q. HAVE YOU PREVIOUSLY FILED TESTIMONY IN THIS PROCEEDING?

A. Yes, on August 4, 2014, I caused to be pre-filed with the Public Service Commission of South Carolina ("Commission") my direct testimony and exhibits.

Q. WHAT IS THE PURPOSE OF YOUR SUPPLEMENTAL TESTIMONY IN THIS PROCEEDING?

A. The purpose of my supplemental testimony is to provide the Commission with additional information about Duke Energy Carolinas, LLC's ("DEC" or the "Company") Oconee Nuclear Station ("Oconee") Unit 1 outage that spanned from November 11, 2013 to December 2, 2013. This outage recently has been the topic of media attention in light of a Nuclear Regulatory Commission ("NRC") Regulatory Conference held on July 31, 2014, shortly prior to the filing of my direct testimony in this proceeding. My supplemental testimony will also provide information about the NRC's reactor oversight process and status of activities involving the Oconee Unit 1 outage.

Q. PLEASE DESCRIBE THE OUTAGE FOR OCONEE UNIT 1.

A. The Oconee Unit 1 outage was initiated following 347 days of continuous operation to repair a high pressure injection ("HPI") line leak. During normal operations, the HPI system controls the reactor coolant system ("RCS") inventory by providing the seal water for the reactor coolant pumps, and recirculating RCS letdown for water quality maintenance and reactor coolant boric acid concentration control. During

abnormal conditions, HPI provides capacity to ensure the RCS remains at expected inventories. The stainless steel HPI lines terminate at injection nozzle assemblies located on each of the four reactor inlet pipes. Each nozzle assembly consists of a carbon steel nozzle (stainless steel clad on the inside) to which a stainless steel transition piece (known in the industry as a "safe-end") is welded. The leak stemmed from a crack in the safe-end to piping weld on the 1B2 high pressure injection nozzle. The Company completed repairs and performed non-destructive examinations on the remaining nozzles with no issues identified. Additional testing and emergent repair on the low pressure service water piping to the shared Unit 1 and Unit 2 feed water pumps was required prior to returning the unit to service. The outage duration was just under 21 days against an estimated plan of approximately 19 days.

Q. DID DEC PERFORM ANY POST OUTAGE CRITIQUE AS DESCRIBED IN YOUR DIRECT TESTIMONY?

A. Yes. The Company performed an extensive cause evaluation of the crack in the weld and how it developed into a through-wall crack. Some of the data used in the root cause process included: metallurgical laboratory analysis of the weld material and crack; stress, fatigue, and fracture mechanics analyses using state-of-the-art computer modeling performed by independent experts; Oconee vibration program and vibration testing results; modifications and engineering changes associated to the weld; procedures and programs used for inspections; regulatory commitments for HPI welds near the RCS; and, regulatory guidance for inspections and procedures.

Q. PLEASE DESCRIBE THE RESULTS OR LESSONS FROM THE CAUSE EVALUATION.

A. The evaluation noted the root cause was the result of mechanical, high-cycle fatigue resulting in a through-wall crack of the weld. Analysis indicated that the weld crack was likely initiated in 2008 when the 1B2 reactor coolant pump experienced high vibration during shutdown for cycle 24 refueling due to a pump seal failure. From the initial crack, growth was likely the result of vibrations experienced during periodic HPI flow testing. HPI flow testing is performed during each refueling outage as a requirement of the NRC required In-Service Testing Program and causes short periods of intense vibration.

Q. DOES DEC PERFORM INSPECTIONS OF WELDS?

A. Yes. The Company was utilizing thermal fatigue inspection guidance in accordance with industry guidance from the Electrical Power Research Institute ("EPRI") and with the acceptance criteria of ASME[1] Section XI. Inspections were performed on all 12 HPI connections for all three Oconee units every other refueling outage.

Q. PLEASE EXPLAIN THE NRC OVERSIGHT ACTIONS ASSOCIATED TO THE HPI LINE LEAK THAT RESULTED FROM THE MECHANICAL FAILURE OF THE WELD.

A. The NRC issued a preliminary apparent violation of "greater than green" level of significance for failure to identify and correct a significant condition adverse to quality (10 CFR Part 50, Appendix B, Criterion XVI, Corrective Action). This step within the NRC's reactor oversight process is then followed by analytical activities and active dialog between DEC and the NRC that includes sharing of information

[1] The American Society of Mechanical Engineers

used within the NRC and DEC data models for determining the safety significance associated to the violation. The Company's modeling resulted in a "green" or a "very low" level of significance. The NRC then provides the licensee with an opportunity for a Regulatory Conference, which for the Oconee Unit 1 event, was held on July 31, 2014 in Atlanta. The conference provides a formal public format in which DEC can then provide the NRC with its significance analysis results and, just as importantly, provide details and assurance of corrective actions implemented for improvement. Following the Regulatory Conference, the NRC evaluates the information presented and issues a final notice of significance. The Company received this final notice on August 13, 2014 noting that the NRC issued a "white" finding of "low to moderate" significance.

Q. WHY DIDN'T DEC DISPUTE THE NRC'S FINDING OF VIOLATION?

A. The NRC's reactor oversight process is focused on safety significance and problem identification and resolution, rather than reasonableness and prudence. There are no civil penalties, fines or evidentiary hearings associated with reactor oversight process findings and violations. Rather, depending upon the safety significance of the issue, the NRC may perform supplemental inspections, which are designed to evaluate corrective actions and drive performance improvement. Even though DEC's thermal fatigue inspections were consistent with the EPRI guidance, it was not specific to vibration induced flaws, and did not contain specific guidance that may have identified vibration induced flaws. Consequently, DEC's inspection program did not detect the mechanical fatigue experienced. Given this, DEC accepted that the missed detection of the weld crack prior to development into a

through-wall crack constituted an NRC violation. As a result, DEC has completed an exhaustive extent of condition analysis, and implemented corrective actions to both procedures and the inspection program to prevent recurrence. The NRC, based on the "white" finding, will complete a supplemental inspection focusing on evaluating and ensuring the corrective actions are appropriate to ensure performance improvement.

DEC's acceptance of the NRC finding, however, in no way indicates that our operations were unreasonable or imprudent, or that DEC should be limited in cost recovery including replacement power costs. The Company's root cause analysis confirms that our procedures met the appropriate industry standards and were reasonable and prudent. Additionally, the outage was managed in a very efficient and effective manner that ensured the safety of the workers and kept costs to a minimum. There is no basis for a finding that the outage was a result of DEC's failure to make every reasonable effort to minimize our fuel costs.

Q. IS THERE ANYTHING ADDITIONAL YOU WOULD LIKE TO ADD RELATING TO THE OCONEE OUTAGE?

A. Yes. I want to assure this Commission that at no time was public safety at risk. We take pride and responsibility for operating at the highest level of excellence. The Oconee Unit 1 operators detected the leak at a very low rate (hundredths of a gallon per minute), and reacted promptly and appropriately to safely shut the unit down for repair. Repairs were completed with no recordable injuries and actual dose was under projections.

I also think it is important to keep the Oconee outage in context. The Company has, and continues to, reasonably and prudently manage and operate Oconee and its other nuclear facilities in a manner that delivers benefits to customers. Based on Electric Utility Cost Group cost and performance results for 2013, each of DEC's facilities ranks in the top ten of all U.S. nuclear facilities based on total operating costs (which include operating and maintenance, and administration and fuel costs), with McGuire ranking first, Oconee ranking seventh, and Catawba ranking ninth. Additionally, the Oconee site set new records with a capacity factor of 94.55% for the review period and 315 days of combined continuous operation for all three units. These metrics demonstrate the tangible cost benefits that DEC's nuclear fleet provides to its customers, and when these notable performance results are viewed as a whole, DEC believes that it operated Oconee and its nuclear fleet reasonably and prudently during the review period.

Q. DOES THIS CONCLUDE YOUR PRE-FILED SUPPLEMENTAL TESTIMONY?

A. Yes, it does.

BEFORE
THE PUBLIC SERVICE COMMISSION
OF SOUTH CAROLINA
DOCKET NO. 2014-3-E

In Re:	)	
	)	
Annual Review of Base Rates for	)	**CERTIFICATE OF SERVICE**
Fuel Costs for Duke Energy Carolinas, LLC	)	

This is to certify that I, Toni C. Hawkins, a Paralegal with the law firm of Robinson, McFadden & Moore, P.C., have this day caused to be served upon the person(s) named below the **Supplemental Testimony of Robert J. Duncan, II** in the foregoing matter by placing a copy of same in the United States Mail, postage prepaid, in an envelope addressed as follows:

Shannon Bowyer Hudson, Esquire
Andrew M. Bateman, Esquire
Office of Regulatory Staff
1401 Main Street, Suite 900
Columbia, SC 29201

Scott Elliott, Esquire
Elliott & Elliott, P.A.
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J. Blanding Holman, IV, Esquire
Southern Environmental Law Center
43 Broad Street, Suite 300
Charleston, SC 29401

Dated at Columbia, South Carolina this 15th day of August, 2014.

Toni C. Hawkins

Toni C. Hawkins